PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2002-145238

(43)Date of publication of application : 22.05.2002

(51)Int.Cl. B65D 1/09
B29C 49/08
B29C 49/64
B65D 1/02
// B29K 67:00
B29L 22:00

(21)Application number : 2000-381066

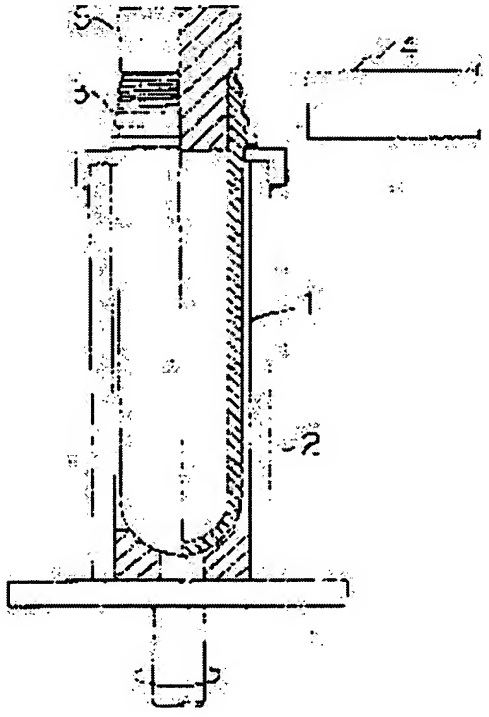
(22)Date of filing : 10.11.2000

(71)Applicant : TOYO SEIKAN KAISHA LTD

(72)Inventor : KOMIYA ATSUSHI

(54) HEAT-RESISTANT PET BOTTLE AND ITS PRODUCTION METHOD

(57)Abstract:



PROBLEM TO BE SOLVED: To provide a heat-resistant pet bottle and the production method of the same whose heat shrink during filling and sterilizing processes is small, which is quite air-tight, whose cap opening torque is stable and whose cap open characteristic is superior.

SOLUTION: This relates to a heat-resistant PET bottle biaxially oriented blow molded using a preform formed in advance with a mouth part which is big in diameter and which is heat processed and shrunk to reach a predetermined mouth diameter in a crystallization shrink range of 3.0%-6.0%. In producing this biaxially oriented blow molded heat-resistant PET bottle, the preform formed in advance with a big mouth diameter is used. The perform is inserted in a holder and is heated outwardly for shrinking in a crystallization shrink range of 3.0%-6.0% to reach the predetermined mouth diameter while the same is rotated. In the mouth part, a core is inserted for adjusting the same in a predetermined size, and then the perform is cooled.

LEGAL STATUS

[Date of request for examination] 16.04.2004

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the approach of manufacturing the PET bottle which was excellent in thermal resistance with biaxial stretching blow molding.
[0002]
[Description of the Prior Art] biaxial stretching blow molding -- the PET bottle [carry out] is used as containers, such as various drinks and a seasoning. Once fabricating the thing of the shape of a test tube called preforming with injection molding, this preforming is heated, and application-of-pressure air is blown, swollen and fabricated in biaxial stretching blow molding within metal mold. Moreover, there is a class of PET bottles, a heat-resistant bottle and sterilization are required for the contents, i.e., a hot pack (restoration between heat) application, which need heat sterilization, and the heat-and-pressure-proof bottle which bears both heat and a pressure is used for the bevel-use way containing brown coal acid gas. With a heat-resistant bottle and a heat-and-pressure-proof bottle, in order to make thermal resistance give the bottle regio oralis, regio-oralis crystallization processing is performed (for example, JP,61-24170,B).
[0003]
[Problem(s) to be Solved by the Invention] Even if it performed regio-oralis crystallization processing, there was a problem contracted although the regio oralis of a bottle is few with heating at restoration / sterilization process. It had the adverse effect on the fitting condition of a cap, sealing performance was torn depending on the case, and there was also a possibility that the suction of cooling water etc. might occur at a stericooling process. Moreover, there was also a problem that unstopping nature (torque) was not stabilized by the dimensional change.
[0004]
[Means for Solving the Problem] this invention -- "1. [ ] -- the heat-resistant PET bottle which comes to carry out biaxial stretching blow molding using preforming in which whose diameter heat-treated the regio oralis of preforming which fabricated **** greatly beforehand, carried out the heat shrink in the range of 3.0% - 6.0% of crystallization contraction, and was reduced to predetermined ****.
2. the manufacture approach of the heat-resistant PET bottle characterized by heating from an outside surface, carrying out a heat shrink in the range of 3.0% - 6.0% of crystallization contraction, reducing the diameter to predetermined ****, making an electrode holder insert and rotate preforming which fabricated **** greatly beforehand, inserting a core subsequently to the regio oralis, and carrying out biaxial stretching blow molding using preforming which adjusted the regio oralis to the predetermined dimension and was cooled. " -- it is related.
[0005]
[Embodiment of the Invention] Even if it heat-treated the regio oralis of the bottle which carried out biaxial stretching blow molding and crystallized, contraction occurred at the process which fills up with, sterilizes and cools contents, the sealing performance of the fitting section with a cap was torn, and this invention person heat-treated the regio oralis of preforming before biaxial stretching blow molding for

the problem which cannot prevent enough that cooling water may be rarely sucked in at a cooling process, solved by carrying out the heat shrink of the amount of specification, and completed this invention. Preforming fabricates aperture greatly beforehand, it heat-treats the regio oralis and it is made it to carry out a heat shrink in the range of crystallization contraction 3.0-6.0, and the diameter of it is reduced in a predetermined dimension, and it is taken as preforming for biaxial stretching blow molding. Crystallization contraction is computed by the degree type here.

[0006]

[Equation 1] crystallization contraction (%) =[{(aperture of preforming before regio-oralis crystallization processing) -(aperture of preforming after regio-oralis crystallization processing)}/ (aperture of preforming before regio-oralis crystallization processing)] x100[0007 --] The path of the regio oralis may be measured with an outer diameter, or may be measured with a bore.

[0008]

[Example] Next, an example is shown and this invention is explained concretely. Heat treatment of the regio oralis of preforming is explained. A place is shown when the regio oralis of preforming is heat-treated to drawing 1 . Drawing 1 shows the vertical one half of preforming in the cross section. 1 is preforming and is inserted in the electrode holder 2. 3 is the regio oralis of preforming and has fabricated aperture greatly beforehand. Although 4 is the heating apparatus countered and formed in the regio oralis of preforming, an infrared heater can heat it efficiently. Although the concrete conditions of heating are different with a heating means, generally, it is 150-220 degrees C in temperature, and it is especially good for 0.3 - 10 minutes to carry [120-250-degree C] out for 1 - 3 minutes especially. An electrode holder rotates so that heating nonuniformity may not arise. Heating advances, the regio oralis crystallizes and it contracts in the range of 3.0% - 6.0% of rates of a heat shrink, and when reducing the diameter to predetermined aperture, a core 5 is inserted in the regio oralis and a predetermined dimension is made to prepare and cool the regio oralis. Falling-off of the core 5 is carried out in the place where the temperature of resin got cold to about 100-160 degrees C, and preforming is further cooled to a room temperature after that, applying cold blast depending on radiationnal cooling or the case. Thus, biaxial stretching blow molding of the regio oralis is carried out using preforming which carried out heat crystallization, and a bottle is obtained.

[0009] Example 1 PET was injection molded and nominal diameter 28mmphi of the regio oralis and neck ring height 22.43mm preforming were obtained. At about 180 degrees C, this preforming was heat-treated with the equipment of drawing 1 for 2 minutes, and the regio oralis was crystallized. Crystallization contraction was 3.6%. Biaxial stretching blow molding of this preforming was carried out with the conventional method, and the heat-resistant bottle for inner capacity 1.5 l. was obtained.

[0010] The heat-resistant bottle was obtained like the example 1 except having made example of comparison 1 crystallization contraction into 2.5%.

[0011] The heat resistance test was performed about the bottle of the heat resistance test example of the regio oralis, and the example of a comparison. The thermal resistance of a bottle is influenced according to the moisture state of PET. The PET water content of the bottle in front of a trial was about 5000 ppm, and it was examined without attaching a cap. The bottle was immersed in 90-degree C warm water for 5 minutes, and the outer diameter of the bottle regio oralis after immersion was measured. A measurement result is shown in a table 1.

[0012]

[A table 1]

	結晶化収縮率	温水浸漬での収縮量
実施例1	3.5%	0.02mm
比較例1	2.5%	0.23mm

[0013] The bottle used by the sealing trial heat resistance test of the regio oralis and the bottle created similarly are filled up with 87-degree C warm water, and it is screw cap AP3D by Japan crown incorporated company. LP was equipped with and closed. The volume bundle include angle was 136-

137 degrees C. The number which carried out hot water shower sterilization processing of this bottle for 75-degree-C 5 minutes, and sucked in cooling water the back was investigated. A result is shown in a table 2.

[0014]

[A table 2]

	密封性（吸い込み本数）
実施例1	0/30 本
比較例1	11/30 本

[0015] As shown in a table 1 and a table 2, with the bottle of an example, compared with the example of a citation, even if put to hot water, the amount of heat shrinks is very small, and it is hard to generate absorption by the sterilization process.

[0016]

[Effect of the Invention] According to this invention, the heat-resistant PET bottle which was filled up with contents, had few heat shrinks in a stericooling process, was excellent in sealing performance, and the unstopping torque of a cap was stabilized and was excellent in unstopping nature can obtain by easy metal mold dimension modification which chose appropriately the regio-oralis dimension of preforming at the time of injection molding, without changing the production process of the conventional heat-resistant PET bottle.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] The heat-resistant PET bottle which comes to carry out biaxial stretching blow molding using preforming in which whose diameter heat-treated the regio oralis of preforming which fabricated **** greatly beforehand, carried out the heat shrink in the range of 3.0% - 6.0% of crystallization contraction, and was reduced to predetermined ****.
[Claim 2] The manufacture approach of the heat-resistant PET bottle characterized by heating from an outside surface, carrying out a heat shrink in the range of 3.0% - 6.0% of crystallization contraction, reducing the diameter to predetermined ****, making an electrode holder insert and rotate preforming which fabricated **** greatly beforehand, inserting a core subsequently to the regio oralis, and carrying out biaxial stretching blow molding using preforming which adjusted the regio oralis to the predetermined dimension and was cooled.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the explanatory view showing the crystallization processor of the preforming regio oralis.
[Description of Notations]
1 Preforming
2 Electrode Holder
3 Regio Oralis of Preforming
4 Heating Apparatus
5 Core

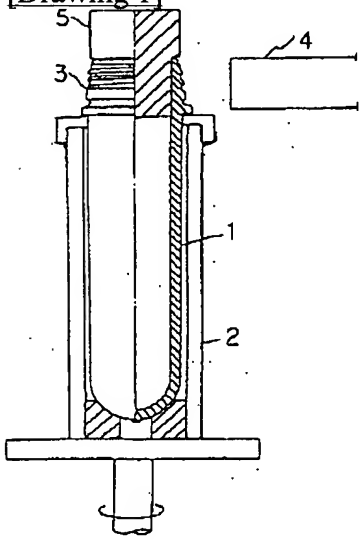
[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]



[Translation done.]

(19)日本国特許庁（ＪＰ）　(12)公開特許公報（Ａ）　(11)特許出願公開番号
特開2002－145238
（P2002－145238A）
(43)公開日　平成14年５月22日(2002.5.22)

(51)Int.Cl.⁷	識別記号	ＦＩ		テーマコード（参考）
Ｂ６５Ｄ　1/09		Ｂ２９Ｃ　49/08		３Ｅ０３３
Ｂ２９Ｃ　49/08			49/64	４Ｆ２０８
49/64		Ｂ６５Ｄ　1/02	Ａ	
Ｂ６５Ｄ　1/02		Ｂ２９Ｋ　67:00		
// Ｂ２９Ｋ　67:00		Ｂ２９Ｌ　22:00		

審査請求　未請求　請求項の数２　書面　（全　３　頁）　最終頁に続く

(21)出願番号　特願2000－381066(P2000－381066)

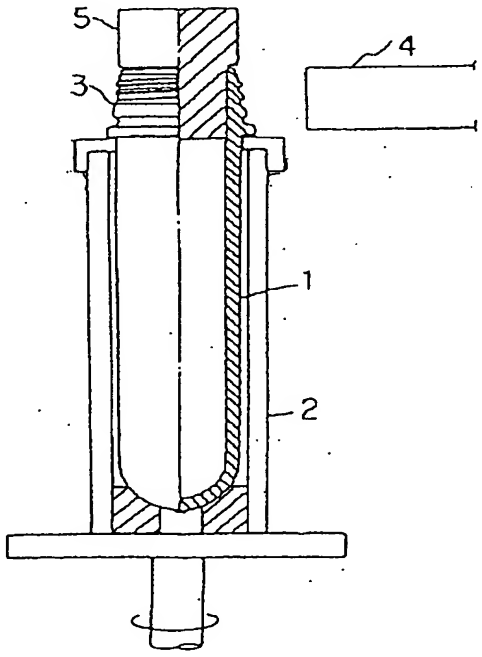
(22)出願日　平成12年11月10日(2000.11.10)

(71)出願人　000003768
東洋製罐株式会社
東京都千代田区内幸町１丁目３番１号
(72)発明者　小宮　温
神奈川県横浜市保土ケ谷区釜台町35－33
(74)代理人　100095175
弁理士　渡辺　秀夫

Ｆターム(参考)　3E033 AA01 BA18 CA07 EA12 FA03
GA02
4F208 AA24 AH55 LA02 LA04 LB01
LG28 LG35 LH07 LH09 LH18

(54)【発明の名称】　耐熱性ＰＥＴボトルとその製造方法

(57)【要約】
【課題】　充填、殺菌工程での熱収縮が少なく、密封性に優れ、開栓トルクが安定し、開栓性の良好な耐熱性ＰＥＴボトルとその製造方法を提供する。
【解決手段】　予め口経を大きく成形したプリフォームの口部を熱処理し結晶化収縮率３．０％～６．０％の範囲で熱収縮して所定の口経に縮径したプリフォームを用いて二軸延伸ブロー成形してなる、耐熱性ＰＥＴボトルと、予め口経を大きく成形したプリフォームをホルダーに挿入し、回転させつつ外面から加熱して結晶化収縮率３．０％～６．０％の範囲で熱収縮して所定の口経に縮径し、次いでコアを口部に挿入して口部を所定寸法に調整して冷却したプリフォームを用いて二軸延伸ブロー成形することを特徴とする耐熱性ＰＥＴボトルの製造方法である。



1

【特許請求の範囲】
【請求項１】　予め口経を大きく成形したブリフォームの口部を熱処理し結晶化収縮率３．０％～６．０％の範囲で熱収縮して所定の口経に縮径したブリフォームを用いて二軸延伸ブロー成形してなる、耐熱性ＰＥＴボトル。
【請求項２】　予め口経を大きく成形したブリフォームをホルダーに挿入し、回転させつつ外面から加熱して結晶化収縮率３．０％～６．０％の範囲で熱収縮して所定の口経に縮径し、次いでコアを口部に挿入して口部を所定寸法に調整して冷却したブリフォームを用いて二軸延伸ブロー成形することを特徴とする耐熱性ＰＥＴボトルの製造方法。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は二軸延伸ブロー成形により耐熱性に優れたＰＥＴボトルを製造する方法に関する。
【０００２】
【従来の技術】二軸延伸ブロー成形しなＰＥＴボトルが各種飲料、調味料等の容器として用いられている。二軸延伸ブロー成形では、一旦、射出成形でブリフォームと呼ばれる試験管状のものを成形した後、このブリフォームを加熱し金型内で加圧空気を吹き込んで膨らませ成形する。また、ＰＥＴボトルには種類があり、熱殺菌が必要な内容物すなわちホットパック（熱間充填）用途には耐熱ボトル、殺菌が必要でかつ炭酸ガス入り飲料用途には熱と圧力の両方に耐える耐熱圧ボトルが使用される。耐熱ボトル・耐熱圧ボトルでは、ボトル口部に耐熱性を付与させるため、口部結晶化処理が行われる（例えば特公昭６１－２４１７０）。
【０００３】
【発明が解決しようとする課題】口部結晶化処理を行なっても、充填・殺菌工程での加熱により、ボトルの口部が僅かではあるが収縮する問題があった。キャップの嵌合状態に悪影響を及ぼし、場合によっては密封性が破れ、殺菌冷却工程で冷却水の吸い込みなどが発生するおそれもあった。また、寸法変化によって、開栓性（トルク）が安定しないという問題もあった。
【０００４】
【課題を解決するための手段】本発明は、
「１．　予め口経を大きく成形したブリフォームの口部を熱処理し結晶化収縮率３．０％～６．０％の範囲で熱収縮して所定の口経に縮径したブリフォームを用いて二軸延伸ブロー成形してなる、耐熱性ＰＥＴボトル。
２．　予め口経を大きく成形したブリフォームをホルダーに挿入し、回転させつつ外面から加熱して結晶化収縮率３．０％～６．０％の範囲で熱収縮して所定の口経に縮径し、次いでコアを口部に挿入して口部を所定寸法に調整して冷却したブリフォームを用いて二軸延伸ブロー成形することを特徴とする耐熱性ＰＥＴボトルの製造方法。」に関する。

2

【０００５】
【発明の実施の形態】本発明者は、二軸延伸ブロー成形したボトルの口部を熱処理して結晶化しても内容物を充填し、殺菌し、冷却する工程で収縮が発生し、キャップとの嵌合部の密封性が破れ、稀に冷却工程で冷却水を吸い込む場合があるのを充分防止することができない問題を、二軸延伸ブロー成形前にブリフォームの口部を熱処理し、特定量の熱収縮をさせることにより解決して本発明を完成した。ブリフォームは予め口径を大きく成形し、口部を熱処理し結晶化収縮率３．０～６．０の範囲で熱収縮させて、所定の寸法に縮径し、二軸延伸ブロー成形用のブリフォームとする。ここで結晶化収縮率は、次式によって算出される。
【０００６】
【数１】結晶化収縮率（％）＝［｛（口部結晶化処理前のブリフォームの口径）－（口部結晶化処理後のブリフォームの口径）｝／（口部結晶化処理前のブリフォームの口径）］×１００
【０００７】口部の径は外径で測定しても、内径で測定してもよい。
【０００８】
【実施例】次に実施例を示して具体的に本発明を説明する。ブリフォームの口部の熱処理について説明する。図１にブリフォームの口部を熱処理するとところを示す。図１はブリフォームの縦半分を断面で示している。１はブリフォームであって、ホルダー２に挿入されている。３はブリフォームの口部であって、予め口径を大きく成形してある。４はブリフォームの口部に対向して設けた加熱装置であるが、赤外線ヒーターが効率よく加熱できる。加熱の具体的条件は加熱手段によっても相違するが、一般に１２０～２５０℃、特に１５０～２２０℃の温度で、０．３～１０分間、特に１～３分間行うのがよい。ホルダーは加熱ムラが生じないように回転する。加熱が進行し、口部が結晶化して熱収縮率３．０％～６．０％の範囲で収縮し、所定の口径に縮径したら口部にコア５を挿入して口部を所定の寸法に整えて冷却させる。樹脂の温度がおよそ１００～１６０℃まで冷えたところで、コア５を脱抜し、その後ブリフォームはさらに放冷、あるいは場合によっては冷風を当てながら室温まで冷却される。このようにして口部を熱結晶化したブリフォームを用いて二軸延伸ブロー成形してボトルが得られる。
【０００９】実施例１
ＰＥＴ樹脂を射出成形し、口部の呼び径２８ｍｍφ、ネックリングハイト２２．４３ｍｍのブリフォームを得た。このブリフォームを図１の装置で約１８０℃で、２分熱処理して、口部の結晶化を行った。結晶化収縮率は３．６％であった。このブリフォームを常法により二軸

延伸ブロー成形して内容量１．５リットル用の耐熱ボトルを得た。

【００１０】比較例１

結晶化収縮率を２．５％とした以外は、実施例１と同様にして、耐熱ボトルを得た。

【００１１】口部の耐熱性試験

実施例と比較例のボトルについて耐熱性試験を行った。ボトルの耐熱性はＰＥＴ樹脂の含水状態によって影響を受ける。試験直前のボトルのＰＥＴ樹脂含水率は約５０００ｐｐｍであり、キャップをつけないで試験した。ボトルを９０℃の温水に５分間浸漬し、浸漬後のボトル口部の外径を測定した。測定結果を表１に示す。

【００１２】

【表１】

	結晶化収縮率	温水浸漬での収縮量
実施例１	3.5%	0.02mm
比較例１	2.5%	0.23mm

【００１３】口部の密封性試験

耐熱性試験で用いたボトルと同様にして作成したボトルに、８７℃の温水を充填し、日本クラウン株式会社製のスクリューキャップＡＰ３Ｄ　ＬＰを装着して封止した。巻き締め角度は１３６～１３７℃であった。このボトルを７５℃５分熱水シャワー殺菌処理してのち、冷却水を吸い込んだ本数を調べた。結果を表２に示す。

【００１４】

＊【表２】

	密封性（吸い込み本数）
実施例１	0/30 本
比較例１	11/30 本

【００１５】表１、表２からわかるように、実施例のボトルでは引用例に比べて、熱水に曝されても熱収縮量が極めて小さく、また殺菌工程での吸い込みが発生しにくい。

【００１６】

【発明の効果】本発明によれば、内容物を充填し殺菌冷却工程での熱収縮が少なく、密封性に優れ、かつキャップの開栓トルクが安定し開栓性に優れた耐熱性ＰＥＴボトルが、従来の耐熱性ＰＥＴボトルの製造工程を変更することなく、射出成形時のブリフォームの口部寸法を適切に選択した簡単な金型寸法変更で得ることができる。

【図面の簡単な説明】

【図１】ブリフォーム口部の結晶化処理装置を示す説明図である。

【符号の説明】

1　ブリフォーム
2　ホルダー
3　ブリフォームの口部
4　加熱装置
5　コア

【図１】